High Frequency Communication Systems

Homework 6 - Two Dimensional FDTD

Semester 2, 2020/21

1. Modify the code in the notebook and simulate a PEC slab of width $w = 25\,\text{mm}$. You may place it starting at $150\,\text{mm}$ [3]

2. Create a hardwired sinusoidal excitation source $J_z = \sin(n \times \pi/10)$ that lasts in the time duration $n \geq 1$ and $n \leq 10$. [3]

3. For the boundary conditions, write down the expressions for the below and show them for the sinsoidal excitation above:

   (a) PEC boundary at the right side [2]

   (b) PMC boundary at the right side [2]

   Set the `maxTime` parameter to `1000` to visualise the effect of the different boundary conditions above.

4. Create a structure as shown in the figure below and visualise the transmitted and reflected fields. Use the absorbing boundary conditions and a hard-wired Gaussian excitation source. Set the `maxTime` parameter to `2000` to visualise the effect of the different boundary conditions above. [5]
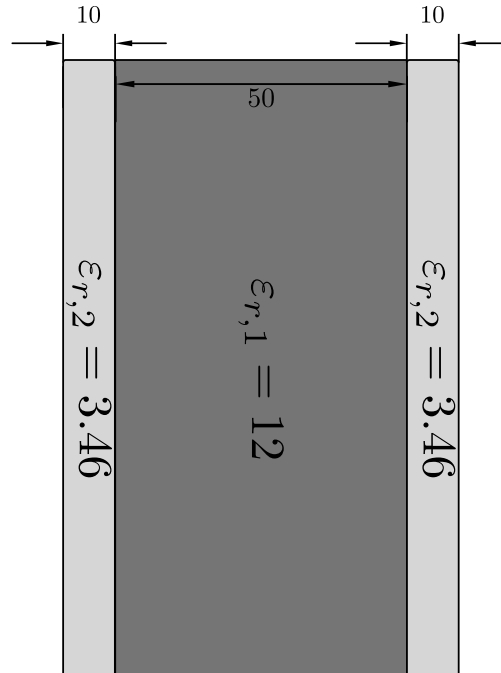

Figure 1: Multilayer Structure

Note: The thickness units in the simulation are arbitrary. Please go to the next page for submission instructions.

Submission Instructions

Fork the Github repository. Create a new cell for each question. For submission, you will have to provide the Github link for where you have deposited the modified repo or give us the My Binder link where we can directly run your notebook.